Shamak Dutta

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https://shamak.github.io/

Research Interests

I am interested in computational neuroscience, machine learning and optimization. I am currently interested in the forward-backward dynamics of the human visual system and how it compares to back-propagation in artificial neural networks.

Education

University of Waterloo — **Waterloo, Ontario, Canada**
Bachelors of Applied Science, Computer Engineering, Honours — *September 2012 - April 2017*

University of Waterloo — **Waterloo, Ontario, Canada**
Candidate for Masters in Systems Design Engineering — *September 2017 - August 2019 (expected)*
Advisors: Dr. Bryan Tripp & Dr. Graham Taylor

Publications

H. Tizhoosh, C. Mitcheltree, S. Zhu, and **S. Dutta**. *Barcodes for Medical Image Retrieval Using Autoencoded Radon Transform*. In International Conference on Pattern Recognition (ICPR), 2016.

Research

Undergraduate Research, Deep Learning for Motion Analysis — **Waterloo, Ontario, Canada**
Advisor: Dr. Dana Kulić, Adaptive Systems Lab, University of Waterloo — *May 2016 - August 2016*

- Analyzed deep recurrent neural networks to model human motion for forecasting & labeling

Undergraduate Research, Applied Combinatorial Optimization — **Waterloo, Ontario, Canada**
Advisor: Dr. Stephen Smith, University of Waterloo — *May 2016 - August 2016*

- Implemented a heuristic-based solver using large-scale adaptive neighbourhood search for the Generalized Travelling Salesman Problem with overlapping sets

Undergraduate Research, Deep Learning for Image Retrieval — **Waterloo, Ontario, Canada**
Advisor: Dr. H. Tizhoosh, KIMIA Lab, University of Waterloo — *September 2015 - December 2015*

- Co-authored a paper on deep autoencoders trained on Radon transforms for content-based image retrieval, accepted at International Conference on Pattern Recognition (ICPR), 2016

Industry

Morpheus Labs — **Oxford, Oxfordshire, United Kingdom**
Research Intern — *June 2017 - September 2017*
Advisors: Dr. Shimon Whiteson & Dr. João Messias

- Computer Vision & Reinforcement Learning

A9 — **Palo Alto, California, USA**
Research Intern, Amazon Search — *September 2016 - December 2016*
Advisor: Dr. Erick Cantu-Paz

- Built a neural model to capture the semantics between search queries and products on Amazon Search
- Introduced a deep neural model to approximate the search ranking function which achieved near-par accuracy with the current machine learned system on Amazon Search
- Organized a tutorial in TensorFlow on character-level language models using recurrent neural networks

A9 **Palo Alto, California, USA**
Software Engineer Intern, Amazon Advertising *January 2016 - April 2016*

- Modified an open source distributed search engine, Elasticsearch, to return 1 million document field values in 100ms which gave a 200x speed improvement from the default implementation

Lookout **San Francisco, California, USA**
Software Engineer Intern, Security & Infrastructure *May 2015 - August 2015*

- Built a search parser to convert structured natural text into an Elasticsearch query
- Developed a scoring algorithm for code reviews using leaderboards which won at an internal hackathon

Avvasi **Waterloo, Ontario, Canada**
Software Engineer Intern, Core Platform *September 2014 - December 2014*

- Built & shipped a network testing framework from scratch for high performant computer blades with a heavy emphasis on concurrency and parallelization, ultimately automating production workflow

Achievers **Toronto, Ontario, Canada**
Software Engineer Intern, Infrastructure *January 2014 - April 2014*

pVelocity **Toronto, Ontario, Canada**
Software Engineer Intern, Quality Assurance *May 2013 - August 2013*

Honors & Awards

- Engineering International Student Scholarship, University of Waterloo, 2012
- President's Scholarship of Distinction, University of Waterloo, 2012
- President's Research Award, University of Waterloo, 2015

Coursework

ML: Introduction to Machine Learning, Introduction to Pattern Recognition, Cooperative & Adaptive Algorithms

Math: Discrete Math, Multivariate Calculus, Linear Algebra, Probability Theory & Statistics

Algorithms & Control: Quantum Mechanics, Robot Dynamics & Control, Analog Control, Computer Networks, Digital Hardware Systems, Compilers, Embedded Microprocessor Systems

Signal Processing: Signals & Systems, Analog & Digital Communications

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Technical Skills

Languages: Python, Java, Ruby, C++

Software: TensorFlow, Theano, Julia, Hadoop, Matlab